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PATENT & TRADEMARK OFFICE

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Docket No.: 064965-0107

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Customer Number: 20277
Philip KELLER, et al.	:	Confirmation Number: 7973
Application No.: 09/336,709	:	Group Art Unit: 2646
Filed: June 21, 1999	:	Examiner: J. F. Harold

For: SELF-CALIBRATION PROCEDURE IN PHYSICAL LAYER TRANSCEIVER FOR HOME TELEPHONE WIRE NETWORK

REQUEST TO REINSTATE APPEAL

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with 37 CFR 1.193(b)(2), reinstatement of the appeal filed in the above identified application is respectfully requested.

This request is accompanied by a Supplemental Appeal Brief.

REMARKS

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Docket No.: 064965-0107 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	:	Customer Number: 20277
Philip KELLER, et al.	:	Confirmation Number: 7973
Application No.: 09/336,709	:	Tech Center Art Unit: 2646
Filed: June 21, 1999	:	Examiner: J. F. Harold

For: SELF-CALIBRATION PROCEDURE IN PHYSICAL LAYER TRANSCEIVER FOR HOME TELEPHONE WIRE NETWORK

SUPPLEMENTAL APPEAL BRIEF

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Supplemental Appeal Brief accompanies a Request to Reinstate Appeal submitted in response to the Office Action mailed January 26, 2006.

Real Party In Interest

This application is assigned to Advanced Micro Devices, Inc. by assignment recorded on 06/21/1999, at Reel 010045, Frame 0475.

Related Appeals and Interferences

No other appeals or interferences are known to the Appellant, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 1-17 are pending. Claims 3, 4 and 12-17 are found allowable subject to being rewritten in independent form. Claims 1, 2, 5-11 stand under final rejection, from which rejection this appeal is taken.

Status of Amendments

The application has not been amended after final Office Action

Summary of Claimed Subject Matter

The claimed subject matter relates to method and system for performing self-calibration in a physical layer transceiver for data communications over existing residential telephone line wiring.

Figure 1 illustrates a home telephone wire network 10 according to an embodiment of the invention, using existing residential wiring such as twisted pair telephone line wiring as network media. As shown in Figure 1, the network 10 supporting the Ethernet (IEEE 802.3) standard includes network stations 12a and 12b that are connected to a twisted pair telephone line wiring 14, via RJ-11 phone jacks 16a and 16b respectively. A telephone 18 connected to the RJ-11 phone jack 16c may continue to make phone calls while stations 12a and 12b are communicating.

As shown in Figure 1, each network station 12, for example a personal computer, printer, or intelligent consumer electronics device, includes a physical layer (PHY) transceiver 20, a media access (MAC) layer 22, and an operating system (OS) layer that performs higher layer function according to the OSI reference model.

A home telephone wire network environment of the present disclosure provides the advantage that existing telephone wiring in a home may be used to implement a home network environment. However, telephone lines are inherently noisy due to spurious noise caused by electrical devices in the

home, for example dimmer switches, transformers of home appliances, etc. In addition, the twisted pair telephone lines suffer from turn-on transients due to on-hook and off-hook and noise pulses from the standard Plain Old Telephone System (POTS) telephones, and electrical systems such as heating and air conditioning systems, etc.

An additional problem in telephone wiring networks is that the signal condition (i.e., shape) of a transmitted waveform depends largely on the wiring topology. Numerous branch connections in the twisted pair telephone line medium, as well as the different associated lengths of the branch connections, may cause multiple signal reflections on a transmitted network signal. Telephone wiring topology may cause the network signal from one network station to have a peak-to-peak voltage on the order.of 10 to 20 millivolts, whereas network signals from another network station may have a value on the order of one to two volts. Hence, the amplitude and shape of a received pulse may be so distorted that recovery of transmit data from the received pulse becomes substantially difficult.

To address these problems, the physical layer transceiver 20 is capable of self-calibration to adjust the signal processing circuitry on the receive side to optimize accurate recovery data from the transmitted network signals. In particular, the improvement of reception characteristics, for example, selecting an optimum gain of receiving circuits enables the transmitted data packet to be more reliably received by a receiving network station, reducing the bit error rate of received data packets.

As shown in Figure 3, the physical layer transceiver 20 includes an input amplifier 30 for amplifying analog network signals received from the telephone medium, such as the network signals shown in Figure 2C. The physical layer transceiver 20 also includes a signal conditioning circuit 32 that includes an envelope detection circuit 34 and an energy detection circuit 36. The envelope detection circuit 34 is responsive to the amplified received signal 26 to generate the envelope signal 28. For example, the envelope detector 34 includes an absolute value circuit (e.g., a rectifier circuit)

that generates an absolute value signal 39 representing the absolute value of the amplified received signal 26, and a low pass filter coupled to the rectifier circuit for filtering out high-frequency components of the rectified signal, resulting in the envelope signal 28. The envelope signal 28 is output from the envelope detector 34 and supplied to the energy detector 36. The energy detector 36 includes an integrator that performs the mathematical process of integration of the envelope signal 28 over time to produce a signal proportional to energy of the received pulse signal.

The physical layer transceiver 20 also includes slicer circuits 38a, 38b, 38c and 38d, and a digital to analog (D/A) converter 40 for supplying analog threshold signals to the slicer circuits 38. Further, the physical layer transceiver 20 includes a digital controller 41 configured for controlling the digital analog converter 40 to output threshold signals supplied to the slicer circuits 38, and a transmitter portion 52 (e.g., an output current amplifier), that converts transmit data (TxD) produced by the digital controller 41 to an analog network signal. The analog network signal is output at a selected one of 128 output gain values based on a 7-bit transmit gain (TxGain) signal output by the digital controller 41.

The reception characteristics, such as the gain of the input amplifier 30, substantially vary from one transceiver chip to another depending on various process parameters. For example, the receiver gain may vary by up to 50%.

Therefore, there is a need for calibrating the receiver circuit to a predetermined level, in order to maintain consistent reception characteristics of all physical layer transceivers in the network 10.

In particular, in accordance with the present invention, the input amplifier 34 is calibrated during an initialization period, for example, at power-up. A known transmit signal at the output of the transmitter 52 may be used as a calibration signal. For example, access identification (AID) transmit pulses formed by the transmitter 52 may be used as a calibration pulse stream. In response to the AID

pulses of a selected level, the gain of the input amplifier is adjusted to an optimum value that provides a predetermined signal level at the output of the envelope detector 34 or energy detector 36.

As shown in Figure 5 that illustrates the self-calibration procedure of the present invention, at power-up or during an initialization procedure, the digital controller 41 sets the transmit gain control signal TxGain to a selected value that provides a desired output of the transmitter 52 (block 102). For example, the output of the transmitter 52 may be set to a level corresponding to the maximum value in the dynamic range (i.e., linear region) of the receiver circuitry.

The peak amplitude of the AID envelope pulse produced at the output of the envelope detector 34 is compared by the slicer circuit 38a with the input amplifier test level (block 110). If the digital controller 41 detects that the value of the envelope pulse exceeds the test level, it lowers the gain of the input amplifier 30 by reducing the gain control value supplied to the input amplifier 30 (block 112). If the peak value of the envelope pulse is less than the input amplifier test level, the digital controller 41 raises the gain of the input amplifier 30 (block 114). The input amplifier gain control procedure is performed until the digital controller detects that a pulse test number (PTN) that defines the maximum number of iterations in the successive approximation algorithm is equal to 0.

Hence, at power-up or during the initialization procedure, a known level of AID pulses produced by the transmitter 52 is used by the physical layer transceiver 20 of the present invention to calibrate the input amplifier 30 by adjusting its gain to a fixed optimum level, for example, corresponding to the maximum level of the reception dynamic range. As a result, the present invention reduces the effects of process variations that limit the receiver sensitivity.

Grounds of Rejection To Be Reviewed By Appeal

Whether claims 1, 2, and 5-11 are unpatentable over Roberts et al. (4,637,064) in view of Ishida et al. (6,029,047) under 35 U.S.C. 103(a).

Argument

In the application of a rejection under 35 U.S.C. §103, it is incumbent upon the Examiner to factually support a conclusion of obviousness. As stated in ***Graham v. John Deere Co.*** 383 U.S. 1, 13, 148 U.S.P.Q. 459, 465 (1966), obviousness under 35 U.S.C. §103 must be determined by considering (1) the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims in issue; and (3) resolving the level of ordinary skill in the pertinent art. The Examiner must provide a reason why one having ordinary skill in the art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. ***Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.***, 776 F.2d 281, 227 USPQ 657 (Fed. Cir. 1985). ***In re Fine***, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); ***Stratoflex, Inc. v. Aeroquip Corp.***, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); ***In re Warner***, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967).

This showing by the Examiner is an essential part of complying with the burden of presenting a *prima facie* case of obviousness. ***In re Oetiker***, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

The Examiner has failed to provide the requisite reasons for modifying the references and thus to establish a *prima facie* case of obviousness.

In particular, claim 1 recites a method of configuring a transceiver for providing data communications via residential telephone line wiring, the method comprising the steps of:

transmitting a pulse signal having a selected amplitude by a transmit section of the transceiver,

receiving the pulse signal by an input circuit in a receiver section of the transceiver to produce a receive signal representing the pulse signal, and

adjusting gain of the input circuit so as to produce the receive signal at a predetermined level.

Independent claim 8 recites a transceiver for providing data communications over residential telephone line wiring, comprising:

an input circuit for receiving an incoming signal,

an output circuit for transmitting a transmit signal having a selected amplitude, and

a calibration circuit responsive to a receive signal produced by the input circuit in response to the transmit signal for adjusting gain of the input circuit so as to set the receive signal to a predetermined level.

The Examiner holds Roberts to differ from the claimed invention only in that "Roberts failed to disclose via telephone line (sic)." However, the Examiner takes the position that it would have been obvious "to modify Roberts by specifically providing via telephone line (sic), as taught by Ishida, for the purpose of providing diverse communication media."

Considering the references, Roberts discloses an equalization system for equalizing modem receivers and transmitters in a local area network 10. Each modem includes a transmitter, a receiver and a microcomputer.

The reference does not disclose providing data communications over residential telephone line wiring, as the claims require. Instead, Roberts indicates that the modems transmit and receive data over a cable television (CATV) system (col. 1, lines 12-37, col. 2, lines 43-45). As one skilled in the art would realize and the Examiner appears to admit, data communications in the CATV system is provided over coaxial cables rather than residential telephone line wiring. Moreover, the reference provides no suggestion to use residential telephone line wiring in a cable TV system.

Ishida discloses a cable terminal device 21 coupled to a cable television (CATV) network 30 and a public switched telephone network (PSTN) 31. The cable terminal device 21 comprises a call line selector 28 that selects either a line to the PSTN or a line to the CATV network for connecting to a telephone set 40. This reference specifies that the telephone communication in the CATV network is provided over a coaxial cable or optical fiber (see col. 1, lines 23-26). Hence, Ishida does not teach or suggest providing telephone communication in the CATV network over residential telephone line wiring.

The Examiner offered no logical reason, and no such reason is apparent, to support the conclusion that one having ordinary skill in the art would have been impelled to modify Roberts (that does not teach or suggest providing telephone communication over a CATV system) to include the call line selector 28 of Ishida. It is not apparent why one skilled in the art would have recognized any advantage to be gained by the proposed combination of references.

It is noted that the Examiner did not explain why Roberts needs "providing diverse communication media." However, Roberts does not teach or suggest providing telephone communications over its CATV system. Moreover, the purpose of the Roberts' invention is equalizing a signal level at each TV receiver and transmitter of the CATV system. Accordingly, Roberts has no need to provide telephone communications over the CATV system.

Therefore, there is no motivation to modify Roberts by including a telephone selector of Ishida.

The Examiner has apparently failed to give adequate consideration to the particular problems and solution addressed by the claimed invention. ***Northern Telecom, Inc. v. Datapoint Corp.***, 908 F.2d 931, 15 USPQ2d 1321 (Fed. Cir. 1990); ***In re Rothermel***, 276 F.2d 393, 125 USPQ 328 (CCPA 1960). Specifically, residential telephone line wiring is inherently noisy due to spurious noise caused by electrical devices in the home, telephone wiring topology and turn-on transients from telephones and

electrical systems. To address this problem, the claimed invention provides a transceiver capable of self-calibration to adjust the signal processing circuitry on the receive side to optimize accurate recovery data from the transmitted network signals.

Neither Roberts nor Ishida addresses problems and solutions of the claimed invention relating to recovering signals due to a noisy telephone line communication environment. Therefore, these references cannot suggest the claimed invention.

It is well settled that the test for obviousness is what the combined teachings of the references would have suggested to those having ordinary skill in the art. ***Cable Electric Products, Inc. v. Genmark, Inc.***, 770 F.2d 1015, 226 USPQ 881 (Fed. Cir. 1985). In determining whether a case of prima facie obviousness exists, it is necessary to ascertain whether the prior art teachings appear to be sufficient to one of ordinary skill in the art to suggest making the claimed substitution or other modification. ***In re Lalu***, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1984).

As discussed above, Roberts does not teach or suggest a transceiver for providing data communication over residential telephone line wiring. Even assuming *arguendo* that Roberts were modified to provide telephone communications using its CATV system, this modification would not suggest the transceiver for providing data communications over residential telephone line wiring recited in independent claim 8 or configuring this transceiver, as recited in claim 1.

As Roberts does not teach any means for providing data communications over residential telephone line wiring, the modified teaching of Roberts would still suggest equalizing TV receivers and transmitters of a CATV system.

Moreover, it is noted that the CATV network of Ishida provides telephone communication over a coaxial cable or optical fiber. Therefore, Ishida does not suggest a CATV system that would provide data communications via residential telephone line wiring, as the claims require.

Accordingly, the combination of Roberts with Ishida is not sufficient to arrive at the claimed transceiver for providing data communication over residential telephone line wiring, as claim 8 requires, or the claimed method of configuring this transceiver, as claim 1 recites.

Moreover, Roberts does not disclose transmission and reception of a pulse signal for calibrating the receiver, as claim 1 requires. Instead, the reference discloses tuning the receiver to a calibration tone frequency, and comparing an energy-related parameters of the calibration signal with a reference signal.

Ishida also does not suggest the claimed procedure. Therefore, the combination of Roberts with Ishida would not teach or suggest the claimed transmission and reception of a pulse signal for calibrating the receiver.

Claims 2, 5-7 and 9-11 respectively dependent from claims 1 and 8 also recite elements of the process for configuring a transceiver for providing data communications via residential telephone line wiring, or elements of the claimed transceiver for providing data communications via residential telephone line wiring. Therefore, the applied reference combination would not teach or suggest the subject matter of these claims.

Moreover, the Examiner does not address limitations of claims 9-11 dependent from claim 8.

However, neither Roberts nor Ishida discloses:

- the input circuit including an input amplifier for amplifying the incoming signal and an envelope detector for producing an envelope signal representing the incoming signal, as claim 9 requires; and

the transmit signal comprising a plurality of identification pulses for identifying a transmitting station, as claim 11 requires.

Accordingly, the applied reference combination is not sufficient to suggest the subject matter of these claims.

Conclusion

For all of the foregoing reasons, Appellant respectfully submits that the Examiner has failed to establish a case of prima facie obviousness. Therefore, the rejection of claims 1, 2 and 5-11 under 35 U.S.C. 103 should be reversed.

Respectfully submitted,

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CLAIMS APPENDIX

1. (Previously presented) A method of configuring a transceiver for providing data communications via residential telephone line wiring, the method comprising the steps of:

transmitting a pulse signal having a selected amplitude by a transmit section of the transceiver, receiving the pulse signal by an input circuit in a receiver section of the transceiver to produce a receive signal representing the pulse signal, and

adjusting gain of the input circuit so as to produce the receive signal at a predetermined level.

2. (Original) The method of claim 1, wherein the gain of the input circuit is adjusted to a fixed level during initialization of the transceiver.

5. (Original) The method of claim 1, wherein the step of adjusting gain comprises comparing amplitude of the receive signal with a preset threshold level.

6. (Original) The method of claim 5, wherein the gain is reduced if the amplitude of the receive signal exceeds the threshold level.

7. (Original) The method of claim 6, wherein the gain is increased if the amplitude of the receive signal is less that the threshold level.

8. (Previously presented) A transceiver for providing data communications over residential telephone line wiring, comprising:

an input circuit for receiving an incoming signal,

an output circuit for transmitting a transmit signal having a selected amplitude, and

a calibration circuit responsive to a receive signal produced by the input circuit in response to the transmit signal for adjusting gain of the input circuit so as to set the receive signal to a predetermined level.

9. (Original) The transceiver of claim 8, wherein the input circuit includes an input amplifier for amplifying the incoming signal and an envelope detector for producing an envelope signal representing the incoming signal.

10. (Original) The transceiver of claim 9, wherein the calibration circuit is configured for adjusting gain of the input amplifier.

11. (Original) The transceiver of claim 8, wherein the transmit signal comprises a plurality of identification pulses for identifying a transmitting station.

EVIDENCE APPENDIX

Non-applicable

RELATED PROCEEDINGS APPENDIX

Non-applicable